# Cancer cells are protected by our own immune system

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(PhysOrg.com) -- During the very first few days of development of a cancer, our immune system recognizes cancer cells not as abnormal cells requiring eradication but as cells of the body that need to be protected. This result was obtained by the team led by David Klatzmann at the Laboratoire "Immunologie - Immunopathologies - Immunothérapies" in France. It could enable major advances in the treatment of cancer.

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Since the beginning of the 20th century, scientists have postulated the existence of the "immunosurveillance" of cancer, by which the immune system recognizes cancer cells as being abnormal as soon as they are produced by the body, and then eradicates them. It is only when these cells escape from the immune response that a cancer develops. However, the team led by David Klatzmann, Professor at UPMC, has just revealed that this concept is inexact: the "immunosurveillance" of cancers does exist, but in fact it protects tumor cells when they appear, in the same way as any other normal cells in the body.

When an immune response is induced by the body, two types of lymphocytes (specialized immune system cells) are particularly closely involved: regulatory T-cells and effector T-cells. The former recognize components arising from the body itself and protect tissues from attack using the immune system. By contrast, effector T-cells specifically recognize foreign components and their function is to destroy them.

Most studies focused on interactions between cancer cells and the immune system are performed once cancer development is already well-advanced, when the tumor mass is already organized and detectable. The researchers focused on these interactions, but during the very first few days after the appearance of tumor cells. Using animal models, they showed that appearance of the very first cancer cells triggered an immediate response by regulatory T-cells which migrated rapidly towards the tumor. They recognized molecules on the cancer cells that were also expressed by normal tissues in the body. These regulatory T-cells then blocked the action of effector T-cells, thus preventing them from attacking and destroying the cancer cells. Activated at all times in order to protect healthy tissues, regulatory T-cells are mobilized much more rapidly and strongly than effector T-cells, which are resting before the tumor appears. The scientists also showed that if regulatory T-cells were absent from this first encounter between the immune system and tumor cells, effector responses of the immune system indeed developed and enabled eradication of the tumor.

Regulatory T-cells are thus the first to recognize a tumor and facilitate its development by preventing its eradication by effector T-cells. This suggests that the control of regulatory T-cells should be an essential component in the development of future therapies for cancer. This discovery also opens the way to other therapeutic opportunities, such as preventive anti-tumor vaccination.

More information: Guillaume Darrasse-Jeze, Anne-Sophie Bergot, Aurelie Durgeau, Fabienne Billiard, Benoit L. Salomon, Jose L. Cohen, Bertrand Bellier, Katrina Podsypanina and David Klatzmann. “Tumor emergence is sensed by self-specific CD44hi memory Tregs that create a dominant tolerogenic environment for tumors in mice”. Published in the *Journal of Clinical Investigation* 3 August 2009.

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